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ABSTRACT

A group of clinically depressed mothers and their infants were studied to ascertain effects of mothers' emotional condition on children's behavior and development. Participants in the study were 29 families with an infant believed to be at psychiatric risk. Maternal depression was assessed at the time of family intake with the Center for Epidemiological Studies Depression scale; infants were assessed using both observational and psychometric measures at 7, 12, and 18 months of age. A closely matched control group was assessed at 12 and 18 months of age. Videotapes of 40 minutes of spontaneous mother-infant interaction were made in each family's home. A subsample of 13 mothers was asked to engage in a structured face-to-face interaction for 6 minutes after spontaneous interaction. Findings revealed that the behavior of most mothers was neutral to negative in affect expression. Depressed mothers' involvement with their child was primarily intrusive or angry. In contrast to that of the mothers, infant behavior was more consistently neutral to negative in affect expression. Small but significant differences between depressed and case-control infants were found in mental and motor development. It is concluded that infants' affective and cognitive development may be undermined by daily interactions with a primary caregiver behaving in a disengaged or intrusive way. (RH)

At-Risk Infants: Face-To-Face Interaction and Developmental Differences.

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At-Risk Infant: Face-To-Face Interaction

Developmental Differences

Early social interaction is centrally important to the infant's affective, social, and cognitive development (Clarke-Stewart, 1973; Crockenberg, 1983; Crnic, Ragozin, Greenberg, et al., 1983; Egeland & Farber, 1984; Martin, 1981). The process through which social interaction influences developmental outcome, however, is not well understood. Our work is concerned with hypotheses about the communication of affect between mother and infant during face-to-face interaction and its relation to infant socioemotional and cognitive development.

During interaction with primary caregivers, the infant responds to the affective characteristics of the caregiver's behavior in a way that is specific to that affect (Cohn & Tronick, 1982, 1983; Tronick, 1981). Over time, the infant's emotional reactions are internalized and guide her future evaluations of new situations (Tronick, Cohn, & Shea, in press). According to this hypothesis, the infant whose predominant experience during interactions is one of distress will be less positive and more negative or, at least, more wary in responses to new situations.

In addition to its centrality to affective development, social interaction is a context for the acquisition of skilled behavior (Bruner, 1974). One of the young infant's earliest tasks, following the achievement of state regulation, is to acquire the requisite skills needed to regulate social exchanges

(Sander, 1976). Initially, exchanges are focused entirely on themselves (Tronick, 1981), and each partner's goal can be defined as the achievement of shared positive engagement. With development, objects become increasingly important to the infant, and it must then acquire the skills to share reference to objects (Tronick, 1981). According to data from Bruner (Ratner & Bruner, 1978) and also from studies of social referencing (Campos & Stenberg, 1981), the ability to share external referrents emerges during the second half-year. Social interaction, then, provides experiences essential both to the formation of response biases and to the acquisition of prelinguistic skills, such as turn-taking and shared reference, that contribute to subsequent development.

In order to test these and related hypotheses, my coworkers and I have done a series of studies of normal infants and of infants at risk because of maternal disorder. To test the hypothesis that infants are sensitive to the affective message of their mother's behavior, we asked mothers to simulate depression during face-to-face interactions. We hypothesized that if infants were responsive to maternal affect expression, they would respond in a manner that was specific to their mother's depressed affect. Moreover, if interaction is indeed a skilled activity, then we expected to see that the infants would make goal-directed attempts to effect a change in their mother's behavior. And third, if the emotions generated during interactions carry over into new situations, we expected that infant reactions to simulated depression would continue to influence behavior even after mothers again behaved normally.

Briefly, these predictions were confirmed. When mothers interacted with sad affect, their infants responded in a way that is totally unlike that seen during unperturbed interactions. Infants showed a pattern in which they briefly smiled and then, when the mother continued to interact in a depressed way, they turned away. More generally, infants showed a pattern in which they alternated between crying or fussing and turning away or looking at the mother with a wary expression. Especially important, this pattern of distressed behavior carried over into periods in which the mother behaved normally.

These findings supported the hypotheses that infant face-to-face behavior is closely related to that of the mother; and that patterns of emotional adaptation will influence behavior in other contexts.

In order to follow up on these findings, we have studied a group of clinically depressed mothers and their infants. We have wanted to learn whether depressed muthers would behave in the way that we modeled; and whether their infants would show similar distress and lack of positive affect; and whether they would show deficits in skilled performance on a standardized test of infant development, the Bayley Scales (Bayley, 1969).

The Family Support Project is an NIMH-funded intervention project based in Cambridge, Massachusetts. Twenty-nine families have participated in the program. These families were referred by pediatric and social service providers because the infant was believed to be at psychiatric risk. The families have high rates of factors identified by epidemiologic studies as associated with

both childhood behavioral disorder and the development of psychopathology . These include maternal depression, marital discord and disruption, paternal criminality, prevalence of child abuse or neglect, and low SES (Robins, 1974; Rutter, Yule, Quinton, et al. 1974). Eighty percent of the families are supported by AFDC; half are single-parent families. Thirty-two percent have been classified by the Department of Social Services as maltreating their infants.

Maternal depression was assessed at the time of family intake with the Center for Epidemiological Studies Depression scale (CES-D) (Radloff, 1977). The CES-D is widely used in epidemiologic studies and has been validated against standardized psychiatric interviews that use Research Diagnostic Criteria (Spitzer, Endicott, & Robins, 1978) (Myers & Weissman, 1980). The instrument's false positive rate for depression is a low 6%. The mean CES-D score for our sample is well within the range for outpatient depressives; sixty three percent of the sample had scores within the clinical range for minor depression; fifty four within the range for major depression. Their depression scores were also remarkably stable. When assessed 12 months later, the test-retest correlation for the CES-D was .73.

Twenty-two percent of the mothers in the total clinical sample also have had at least one psychiatric hospitalization prior to the time of this study.

Twenty-nine infants were assessed using both observational and psychometric measures at 7, 12 and 18 months of age (Lyons-Ruth, Connell, Botein, et al., 1983). At 12- and at

18-months we also assessed a closely matched control group. I will be presenting data from the 7-month home assessment and the 12 month administration of the Bayley Scales of Infant Development. Karlen Lyons-Ruth will be presenting the 12 and 18 months Ainsworth findings, and their relation to interaction data at 12 months, in a symposium on Sunday (Lyons-Ruth, Connell, Zoll, & Cohn, 1985).

Forty minutes of spontaneous mother-infant interaction was videotaped in each family's home. The videotaping was conducted by project staff members, at least one of whom was well known to the mother. We told the mothers that we wanted to observe a typical segment of the infant's day and asked them to behave as they normally would.

We asked a subsample of 13 mothers to follow the spontaneous interaction with a structured face-to-face interaction lasting six minutes, the first three of which are included here. The infant was seated in an infant seat mounted on a table and the mother sat in a facing chair. A mirror placed at an angle to the mother permitted a single camera to record frontal views of both mother and infant. This procedure resulted in a similar effect to that obtained with two cameras yoked to a split-screen generator, which we use in or laboratory studies of normal dyads.

Mother and infant behavior during the period of spontaneous observation was subsequently described by means of separate rating scales for each partner (Zoll & Lyons-Ruth, undated). Mother and infant behavior during the structured face-to-face interaction was encoded using behavioral descriptors and a one second sampling

interval (a modification of Tronick, Als, & Brazelton, 1980). Different research assistants scored the spontaneous and the structured interactions. By observing both kinds of interactions and describing them with alternative techniques, we were able to assess whether patterns of behavior were stable across settings and data reduction techniques.

For the structured interaction, the principal maternal behavior codes were *anger/poke; disengage; elicit; and play. Anger/poke* refers to instances in which the mother is either speaking to or handling her infant in a grossly angry way or is roughly poking or pulling at her infant. *Disenegage* refers to instances in which the mother is neutral in affect expression and not interacting with her infant. It includes diverse ways in which the mother may be uninvolved. She may be leaning back and away from her infant; looking away; or passively watching her baby. *Elicit* refers to actions that are rapid or staccatto in nature and appear intended to get the baby's attention. This includes snapping fingers, or bringing her head quickly into the infant's line of vision. *Play* includes all instances of positive affect expression: e.g., smiles and sing-song vocalizations.

Related codes were used to describe infant behavior during structured interactions. *Fuss/cry* refers to negative affect expressions of fussing, grimacing, or crying. *Look Away, object*, and *attend* all refer to neutral to slightly negative affect expression with gaze directed either away from the mother and not toward an object; away from the mother but toward

an object; or toward the mother. Objects were those naturally present, such as the infant seat shoulder strap or a body part used an object (e.g., mother "butter-fly hands")

The behavior of most mothers was neutral to negative in affect expression, but there were important individual differences both in maternal engagement and maternal affect. Depressed mothers, contrary to our expectation, were not uniforml; unresponsive and univolved. Although some did show extreme lack of interest in or involvement with their infants, others showed high levels of involvement, but it was primarily intrusive or angry. This slide presents the findings of maternal behavior during the structured interactions. The individual histograms represent the four principal profiles.

Figure 1

A small number of mothers (denoted *Disengaged*) showed a pattern that was quite similar both to that described in clinical descriptions of depressed mothers and to that which we modeled in our simulated depression study. These mothers were disengaged during 75 percent of the interaction time. They slouched back in their chairs, away from the infant, or they spoke to the baby in an expressionless voice with little variability in facial affect expression. They were seldom positive in affect expression. They looked very much like the mothers in our depression-analog study.

Five of thirteen mothers, represented by the histogram

denoted as *Intrusive*, showed a pattern in which they were angry or poking or pulling at their infant more than 25% of the time. This kind of intrusive behavior, which is so common in this sample, is unkown in our normative studies of nondepressed dyads.

The third group, denoted *Positive*, is one with a high proportion of positive affect expression and a very low rate of anger or poking. The behavior of these mothers is, at least in terms of proportion of positive affect expression, within the bounds found in our studies of normal or nondepressed mother-infant pairs. I should add that two of these mothers were the only ones with CES-D scores in the subclinical range.

Last, three mothers showed a varied, trial-and-error pattern. They showed roughly comparable rates of *anger/poking, disengage, elicit, and play*. This group represents a cross between those I have classified as *Intrusive* and as *Positive*.

Maternal behavior during structured, face-to-face interactions was consistent with that observed during the spontaneous interactions. Both the maternal profiles and the quantitative scores on which they were based correlate with ratings of comparable behavior behavior during the spontaneous interactions. *Anger/poke*, for instance, during the structured face-to-face interaction correlated .57 ($p < .05$) with ratings of similar behavior during the spontaneous interaction. As another example, indices of maternal positive expression correlated .51 ($p < .10$) between the two types of interactions. These data suggest that the behavior which we observed was in general characteristic of these mothers.

Infant behavior, in contrast to that of the mothers, was more consistently neutral to negative in affect expression. This finding supports the hypothesis that the high proportions of maternal neutral to negative, but not-positive, behavior observed in both types of interactions were typical. The next slides show infant profiles for each of the mother classifications.

Figure 2

Two infant behaviors closely correspond to maternal behavior and classification. These are *look away* and *protest*. Mother *Intrusive* resulted in a high proportion of infant *look away* (r=.54, p <.05). Infants in the intrusive grouping spent almost 70% of their time looking away from their mother. The strongest relation, however, is that between the mother-classification *Disengaged* and infant *protest*. Mother-*Disengaged* correlated .87 (p <.01) with infant *protest*. The most disturbing behavior for these infants was the pattern of maternal disengagement. Not even high rates of poking provoked comparable upset.

Although there was a marginally significant correlation between the proportions of mother and infant *play* (r=.51, p <.10), the sparse proportions of infant *play* suggest little actual dependence in *play* between mothers and infants. Moreover, unlike what we have found in nondepressed samples, these mothers appeared as likely to sober as to remain positive when their infants did become positive in affect expression. Whereas the typical pattern in normal dyads is for periods of joint

positive engagement to be ended by the infant, in these dyads the opposite was often the case. Mothers did not consistently provide a positive frame within which their infants could cycle to and from positive expression.

One feature of infant behavior is less noticeable, but not unimportant. That is the relative absence of attention to objects. During structured interactions observed in a laboratory setting, infants of this age attend to objects two to three times more than that found here. Although this may in part be related to differences in setting (home vs. lab), it is difficult to believe that the low rates of infant object attention are unrelated to more general features of the interaction.

To summarize the 7-month data, these interactions were strikingly unlike those that we have observed in normal samples. They were characterized by little joint visual regard and few bouts of positive engagement. Mothers tended to behave in a relatively detached manner or to behave with great impatience and insensitivity toward their infants. Infants responded with high rates of looking away and, in the case of maternal *Disengaged*, fussing and crying. Maternal positive affect expression, when it did occur, resulted in little real increase in infant positive affect expression. Although there was a tendency for infants to match mothers in positive as well as negative affect expression, the latter was far more pronounced. In addition, we saw no evidence of infants attempting to positively elicit their mothers to change their behavior. Infant coping in response to a depressed mother was limited to negative strategies: avoiding contact by orienting away from the mother or else protesting. Not

only were the infants uninvolved in any positive way with their mothers, but they were markedly uninvolved with objects as well.

In light of the striking differences observed between these and normal dyads, we were especially interested to see whether there would be evident developmental delays as assessed by the Bayley Scales of Infant Development. Twenty-four of the original twenty-nine infants were tested at 12 months of age, and their scores were compared to those of case controls who were carefully matched for SES, mother's education, child's age, gender, and birth order. In this comparison, we found small but significant differences between depressed and case-control infants. Case control infants scored 10 points higher on the mental scale and seven points higher on the motor scale.

In order to learn whether there were continuities between mother and infant behavior during the face-to-face interaction at 7 months and Bayley performance at 12, we computed correlations between selected mother and infant behaviors and Bayley scores. Mother *anger/poke*, which was an important dimension at 7 months in terms of individual differences among both mothers and infants, showed a strong correlation with Bayley scores. *Anger/poke* correlated -.65 with the MDI and -.64 with the PDI (p values both <.025). Of the infant behaviors, *object* showed the strongest relation to the 12-month Bayley, r=.55 with the MDI and .51 with the PDI (p values of <.05 and <.10, respectively). The relation between infant *look away* and Bayley MDI and PDI was less strong and less consistent but in the same direction (r=-.21 for the MDI, n.s., and r=-.52, for the PDI p<.10). To summarize, high proportions of

mother-*anger/poke* and low proportions of infant-*object* at 7 months were each predictive of lowered 12-month Bayley scores.

Although we must be cautious in interpreting these differences, they are congruent with developmental studies relating variability in mother-infant interaction to subsequent Bayley performance (Crockenberg, 1983; Crnic et al., 1983) and with the findings of at least one high-risk project, the Rochester Longitudinal Study (Sameroff, Seifer, & Zax, 1982). The Rochester Study, which compared infants of depressed, schizophrenic, personality disordered, and normal women, found that infants of severely and chronically ill mothers performed more poorly on the Bayley at four months. Although they did not find Bayley differences at 12 months, they did find that chronicity of maternal disturbance was associated with lower scores on the Uzgiris-Hunt (1975) object-permanence scale at 12 months.

Our data, together with that from the Rochester Study and that of other high-risk studies (Grunebaum, Cohler, Kauffman, et al., 1978; Rolf, 1972), suggests that infants and young children of disturbed mothers are at increased risk for delays in cognitive and socioemotional development. The interaction data presented today, when viewed in the context of our studies of non-at-risk dyads (Cohn, Krafchuk, & Ricks, 1984; Tronick, Ricks, & Cohn, 1983; Tronick, Krafchuk, Ricks, Winn, & Cohn, 1985), suggests that impaired outcomes in infants of mentally ill mothers may be traceable to aspects of interactions within the first year.

During normal mother-infant interaction, the mother supports the infant's periods of positive expression (Cohn et al., 1984; Kaye & Fogel, 1980) and its engagement with objects (Cohn et al.,

1984). The data I have presented today suggest that when the mother consistently fails to provide this frame, the infant becomes negative in affect, withdrawing from both the mother and from objects, and that this negativity carries over into periods when the mother behaves more appropriately. Indeed, in the present case, those mothers who were able to interact with high proportions of positive expression were relatively ineffective in eliciting positive expression from their infants. Daily interactions with a primary caregiver who is behaving in a disengaged or intrusive way may then result in a predominantly negative mood and a reduced interest in exploration that serves to undermine both affective and cognitive development.

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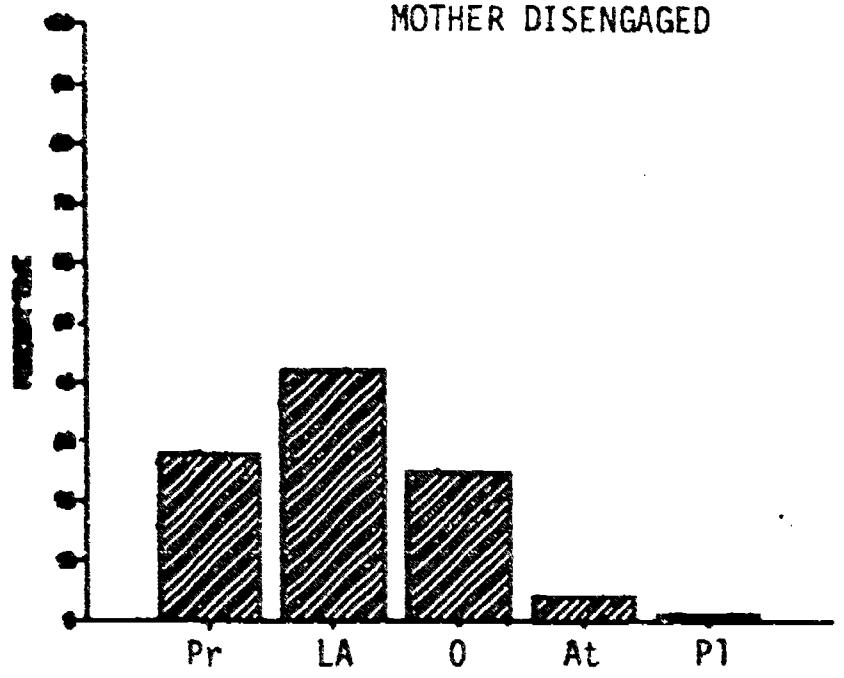
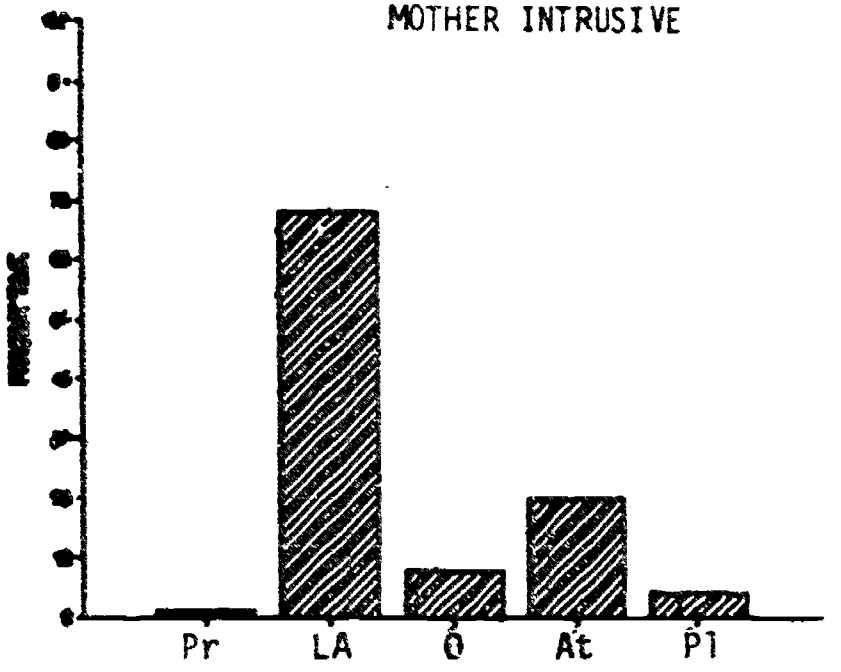
INFANT PROFILE FOR
MOTHER DISENGAGED



INFANT PROFILE FOR
MOTHER INTRUSIVE



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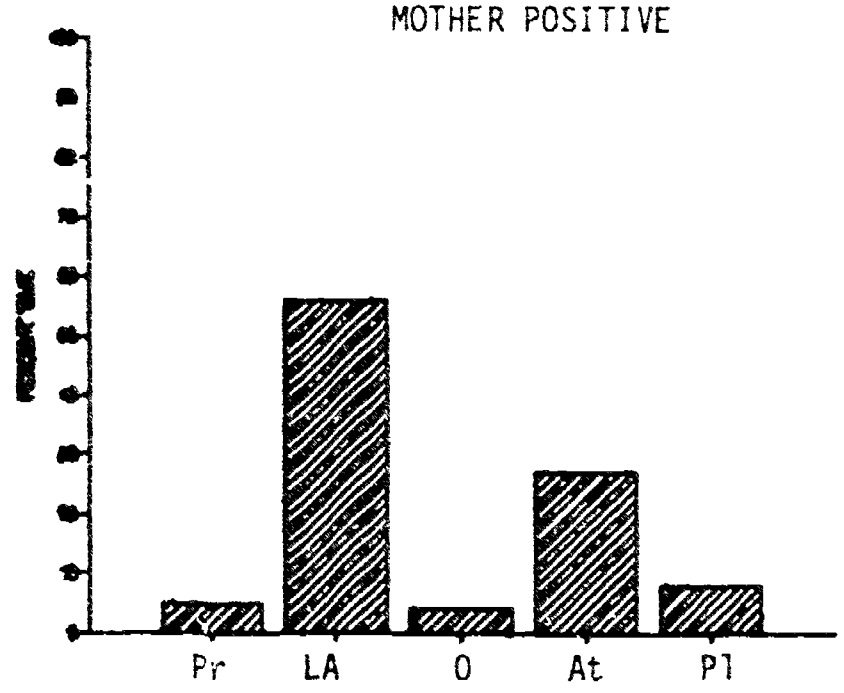

INFANT PROFILE FOR
MOTHER MIXED